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The Commissioner for Patents

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On: June 16, 2004

By: Richard D. Fuerle

Signature: 

Date of Signature: June 16, 2004

Applicants: Qi Wang et al.

Examiner: Egwim, Kelechi Chidi

Serial No.: 10/065,636

Group Art Unit: 1713

Filed: November 5, 2002

For: INHIBITING POLYMER OXIDATION
USING NON-PHENOLIC ANTIOXIDANTS

The Commissioner of Patents
and Trademarks
Washington, D.C. 20231

LETTER

Sir:

Attached hereto are three copies of Appellants' Brief.

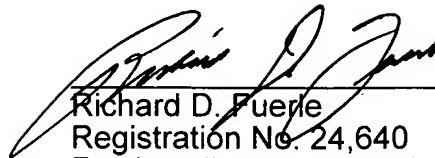
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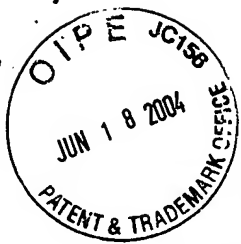
No oral hearing is requested.

Respectfully,



Richard D. Fuelle
Registration No. 24,640
For Appellants

OCCIDENTAL CHEMICAL CORPORATION
5005 LBJ Freeway
Dallas, Texas 75244-6119
(716)-774-0091
June 16, 2004
CASE 6938CIP



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicants: Qi Wang et al.

Examiner: Egwim, Kelechi Chidi

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The Commissioner of Patents
and Trademarks
Alexandria, VA 22313

BRIEF OF APPELLANT

Sir:

This is an appeal from the Final Rejection of the Examiner dated February 17, 2004, rejecting Claims 21, 22, 26, 28, 29, 41, 33 to 36, 38, and 39.

(1) Real Party In Interest

The real party in interest is the assignee, Occidental Chemical Corporation.

(2) Related Appeals and Interferences

This application is a continuation-in-part of application Serial No. 09/223,710, filed December 30, 1998, which was rejected by the Examiner and was appealed (No. 2001-0852). The Board affirmed the Examiner in a decision mailed September 6, 2002.

(3) Status of Claims

Claims 1 to 20 were filed with the application and were canceled.

Claims 21 to 40 were added by amendment.

Claims 23 to 25, 27, 30, 32, 37, and 40 were withdrawn from consideration due to an a requirement to elect a single disclosed species.

Claims 21, 22, 26, 28, 29, 31, 33 to 36, 38, and 39 were rejected by the Examiner and are appealed.

(4) Status of Amendments

Three amendments were filed after the Final Rejection and all three were entered.

(5) Summary of the Invention

Appellants have invented a method of inhibiting the oxidation of poly(vinylchloride), polyethylene, polycarbonate, polyether, or polyester (page 3, lines 6 to 7), which can result in yellowing after exposure to gamma radiation (page 1, lines 13 to 17). Appellants add about 0.005 to about 10 phr of a non-phenolic antioxidant to the polymer (page 4, lines 6 to 7).

(6) Issues

I. Do Claims 21, 22, 26, 28, 29, 31, and 33 fail to meet the requirements of 35 U.S.C. §112, first paragraph?

II. Are Claims 21, 22, 26, 28, 29, 31, and 33 anticipated by Fielding et al.

("Fielding") under 35 U.S.C. §102(b)?

III. Are Claims 21, 22, 26, 28, 29, and 33 anticipated by Jaeger 35 U.S.C. §102(b)?

IV. Are Claims 31, 38, and 39 obvious over Jaeger under 35 U.S.C. §103(a)?

(7) Grouping of Claims

Claims 27 and 37 do not stand or fall with the remaining claims because these claims are directed to a polymeric antioxidant.

Claims 31 and 34 to 39 do not stand or fall with the remaining claims because these claims are limited to poly(vinylchloride).

(8) Argument

I. Claims 21, 22, 26, 28, 29, 31, and 33 were rejected under 35 U.S.C. §112, first paragraph. The Examiner states, "There is a lack of disclosure in the specification to enable one skilled in the art to obtain or make **all** [emphasis in original] of the antioxidants being claimed. There is no underlying reference either in the specification or in the record to where all the compounds may be obtained commercially or how the 'commercially available' compounds may be prepared."

The Examiner further states, "A reasonable correlation must exist between the scope of that (sic) is claimed and the scope of enablement provided by applicant's specification to the person of ordinary skill in the art. Applicant does not provide enablement for all the compounds within the scope of applicants claims and it would require under (sic) experimentation for a routineer to prepare at least some of the

compounds representative in the scope of the claims based on applicant's disclosure."

The parent of this application was also rejected under 35 U.S.C. §112, first paragraph, for the same reasons. As a result, this continuation-in-part application was filed, which contains a description of at least one method of preparing each type of compound within the scope of the claims and gives several citations for each process. Appellants will not repeat all that material in this Brief as it is considerable, but simply refer the Board to paragraphs [0008], [0010], and [0011] of the specification. In addition, four working examples of different antioxidants within the scope of Appellants' invention are also provided.

II. Claims 21, 22, 26, 28, 29, 31, and 33 were rejected under 35 U.S.C. §102(b) as anticipated by Fielding. Fielding uses phthalides with "resinous polymers of polypropylene." Appellants' Claim 21 specifically states that "when said antioxidant is a phthalide" the "polymer is selected from the group consisting of poly(vinylchloride), polycarbonates, polyethers, and mixtures thereof." Thus, Appellants' claims do not include polypropylene mixed with phthalides. Therefore, these claims cannot be rejected as anticipated over Fielding.

There is no indication of equivalency with poly(vinylchloride), as would be required to reject Claims 31 and 34 to 39. Claims 31 and 34 to 39 therefore do not stand or fall with the remaining claims. Appellants further note that the Examiner argues only that polyethylene is obvious over Fielding's polypropylene and does not argue the obviousness of poly(vinylchloride).

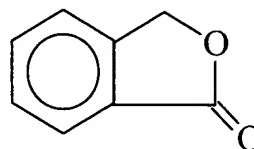
Fielding uses phthalides to improve the impact and flow properties (column 1, lines 52 to 55), while Appellants use their antioxidants to reduce yellowing due to

oxidation (page 1, lines 15 to 17, and the table on page 5). It is not obvious that an antioxidant that improves the impact and flow properties of a polypropylene rubber will reduce yellowing in other polymers. In fact, Fielding teaches that phthalide actually discolors polypropylene. Note column 2, lines 9 to 11, where Fielding states:

“... discoloration of the resinous polymers becomes noticeable due to the slight tan color of phthalide.”

Thus, Fielding teaches that phthalide increases discoloration. It would therefore not be obvious to use phthalides to reduce discoloration.

Claims 23 and 25 are not directed to antioxidants that are not phthalides and are not disclosed or suggested by Fielding. Phthalide, 1(3H)-isobenzofuranone (Registry No. 87-41-2) has the structure:



Therefore, these claims do not stand or fall with the remaining claims in this rejection.

Claims 27 and 37 are directed to polymeric antioxidants, which are not disclosed or suggested by Fielding and therefore do not stand or fall with the remaining claims in this rejection.

Claims 21, 22, 26, 28, 29, and 33 were rejected as anticipated by Jaeger under 35 U.S.C. §102(b). The Examiner states, “Jaeger teaches a process of combining polymers with about 3 to 10% of a variety of phthalides, in order to produce improved polymer compositions.” However, all of the claims in this rejection are limited

to just 5 polymers, poly(vinylchloride), polyethylene, polycarbonate, polyether, and polyester. None of those five polymers is mentioned by Jaeger. Jaeger does say (page 3, lines 4 to 8), "In the claims, the expression 'resinous' is used to cover resins such as shellac and the like, and also the synthetic resinoids which are capable of being hardened by heat; it is not limited to natural resins, but includes the compositions recited on page 1 and similar products." Jaeger's claims list specific resins, none of which is similar to any of the 5 polymers claimed by Appellants. As to "the compositions recited on page 1," in his discussion of the prior art Jaeger recites (page 1, lines 9 to 17) a number of resins, but none of them have structures similar to PVC, polyethylene, polycarbonate, polyether, or polyester. Since Jaeger does not disclose the polymers claimed by Appellant, this rejection should be reversed.

Claims 31, 38, and 39 were rejected as obvious over Jaeger under 35 U.S.C. §103(a). Claim 31 limits the polymers to 4 of the 5 polymers listed in Claim 21, PVC, polyethylene, polypropylene, and polycarbonates, and Claims 38 and 39 limit the polymers to 3 of them, PVC, polycarbonates, and polyethers. None of these polymers are similar to the resins used by Jaeger. In particular, all 5 of the polymers used by Appellants are usually thermoplastic while many (if not all) of the resins named by Jaeger are thermoset. Despite Jaeger's characterization of his resins as "thermoplastic" (page 1, line 8), "phenol-aldehyde resins and phenol-ketone resins" (page 1, line 9) are believe to be thermoset resins. Jaeger describes some of his products as "infusible" (Examples 1 and 2) and uses the terms "resin" and "resinoid" (page 3, lines 4 and 5), which suggest thermosets, not thermoplastics. It is not obvious that a phthalide that will soften or plasticize a thermoset resin will prevent the oxidation

of a thermoplastic resin.


Appellants' claims are directed to a method of inhibiting oxidation. Oxidation is a chemical process. Jaeger's invention is directed at plasticizing or softening (page 1, lines 3 and 4) plastics that are otherwise hard and brittle. Plasticizing or softening these plastics is a physical process. Jaeger states (page 2, lines 33 to 43):

"It should be understood that the effect of the phthalids as plasticizers is primarily physical. There is every reason to believe from their behavior that usually no chemical compounds are formed between the phthalids and the plastic compositions in which they are used although of course this cannot be determined with complete accuracy in every case as the final products obtained for molding compositions are not of a character which permit of ready chemical analysis."

There is no reason to suppose that because the phthalides of Jaeger can soften certain hard and brittle plastics, they will be useful in preventing the oxidation of other plastics that Jaeger does not even mention.

For these reasons, it is submitted that Appellants' invention is patentable. The Board is therefore requested to reverse the Examiner and allow Claims 21, 22, 26, 28, 29, 31, 33 to 36, 38, and 39.

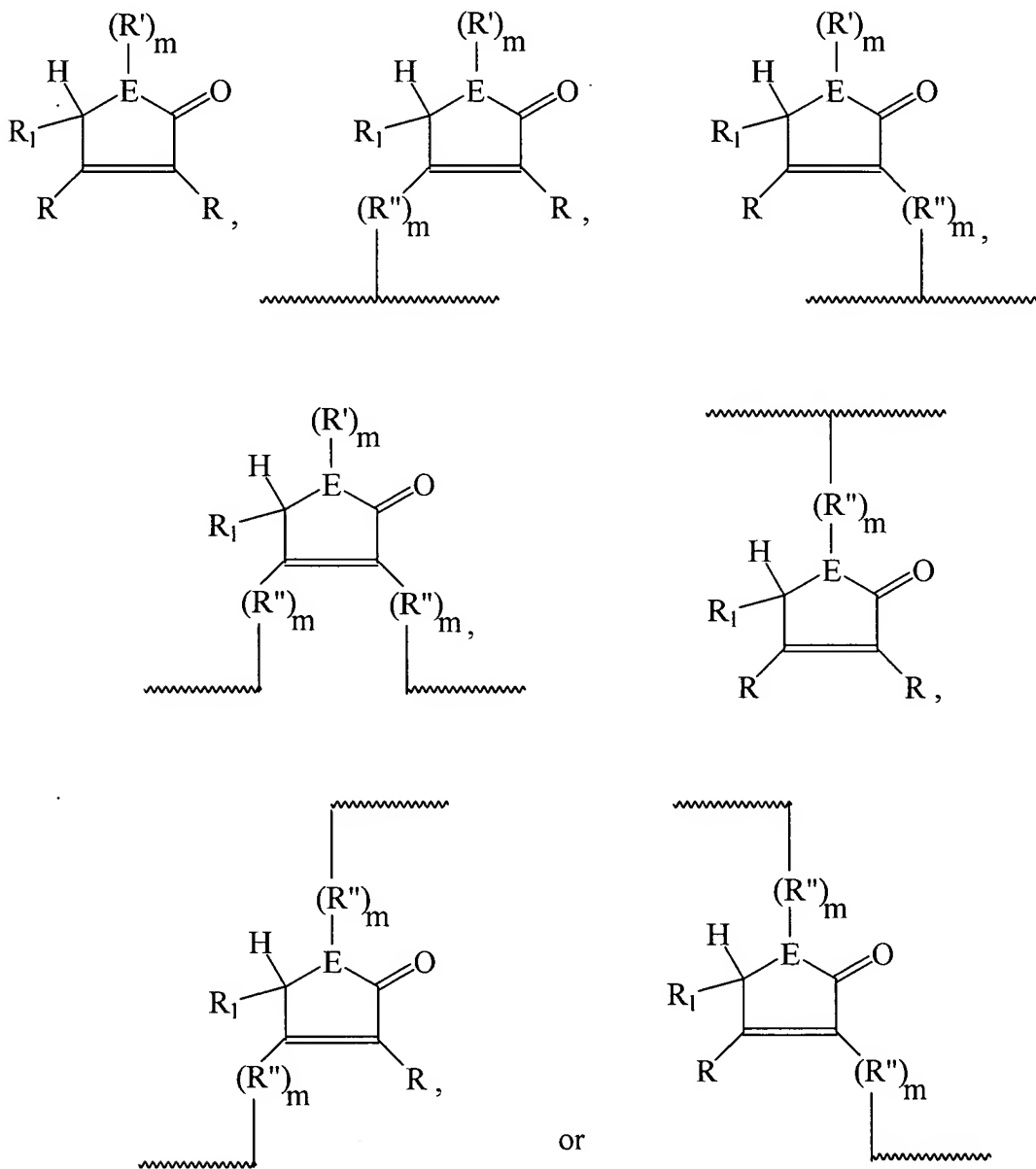
Respectfully submitted,


RICHARD D. FUERLE
Registration No. 24,640
For Appellants

OCCIDENTAL CHEMICAL CORPORATION
5005 LBJ Freeway
Dallas, Texas 75244-6119
(716)-774-0091
CASE 6938CIP
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(9) Appendix

- 1 Claim 21. A method of inhibiting the oxidation of a polymer comprising adding to a
2 polymer about 0.005 to about 10 phr of an antioxidant having the general formula



- 3 where, when an antioxidant is not a phthalide, said polymer is selected from the group
4 consisting of poly(vinylchloride), polycarbonates, polyethers, polyethylene,

5 polypropylene, and mixtures thereof and, when said antioxidant is a phthalide, said
6 polymer is selected from the group consisting of poly(vinylchloride), polycarbonates,
7 polyethers, and mixtures thereof, and where E is O, S, or N; R₁ is H, R', OR', SR',
8 OP(R')₂, or COR'; each R is independently selected from R₁, alkylenyl from C₁ to C₁₂,
9 aminoalkyl from C₁ to C₁₂, and hydroxyalkyl from C₁ to C₁₂; R' is alkyl from C₁ to C₁₂ or
10 aryl, alkylaryl, or aralkyl from C₆ to C₁₂; R'' is G, GO, GS, GNH, NHG, NHGO, NHGNH,
11 NHGS, OG, OGO, OGNH, OGS, SGO, SGNH, or SGS; G is alkylenyl from C₁ to C₁₂,
12 arylenyl from C₆ to C₁₂, alkylarylenyl from C₇ to C₁₂, or arylalkylenyl from C₇ to C₁₂; m is
13 0 if E is O or S and is 1 if E is N; and two R groups can join to form an alicyclic ring or
14 an aromatic ring or an R group and an R₁ group can join to form an alicyclic ring.

Claim 22. A method according to Claim 21 wherein E is O.

Claim 23. A method according to Claim 21 wherein R is OR'.

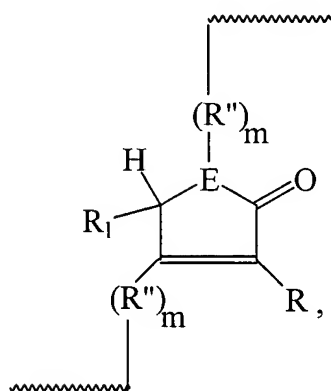
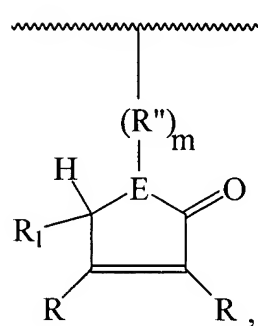
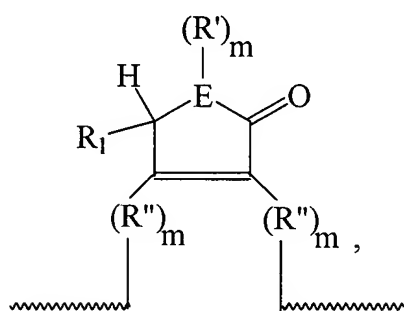
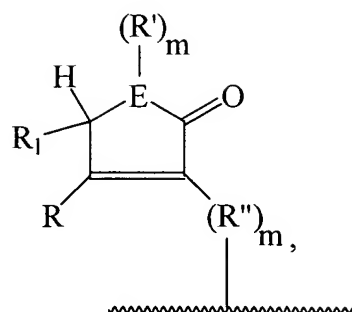
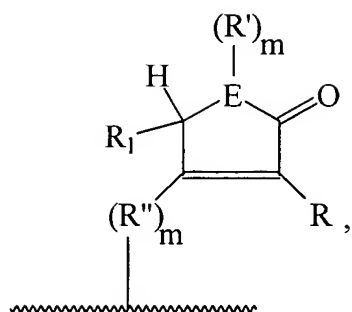
Claim 24. A method according to Claim 21 wherein two R groups join to form an aromatic ring.

Claim 25. A method according to Claim 21 wherein E is N and R' is alkyl from C₁ to C₁₂.

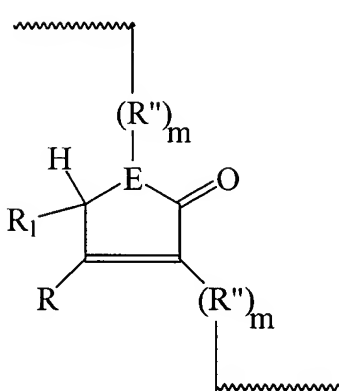
Claim 26. A method according to Claim 21 wherein R₁ is H.

Claim 27. A method according to Claim 21 wherein said antioxidant has the general

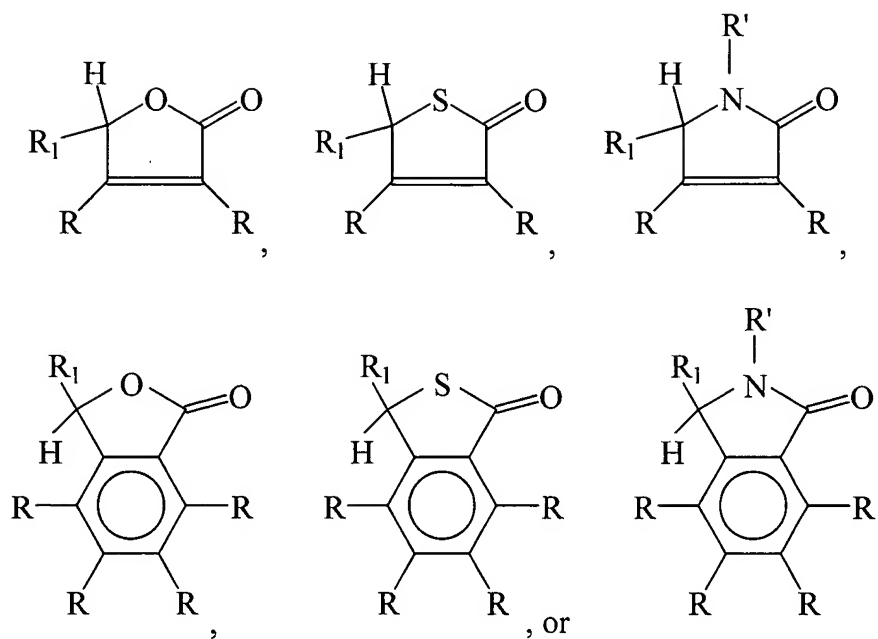
formula



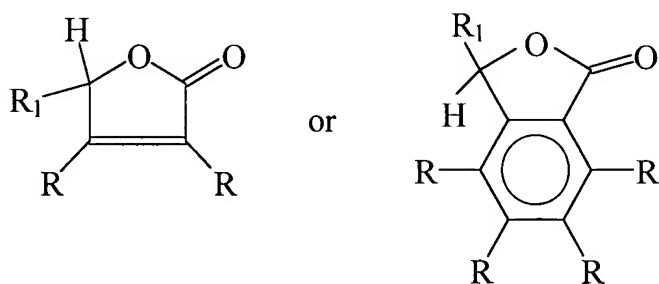
or



Claim 28. A method according to Claim 21 wherein said antioxidant is



Claim 29. A method according to Claim 28 wherein said antioxidant has the formula



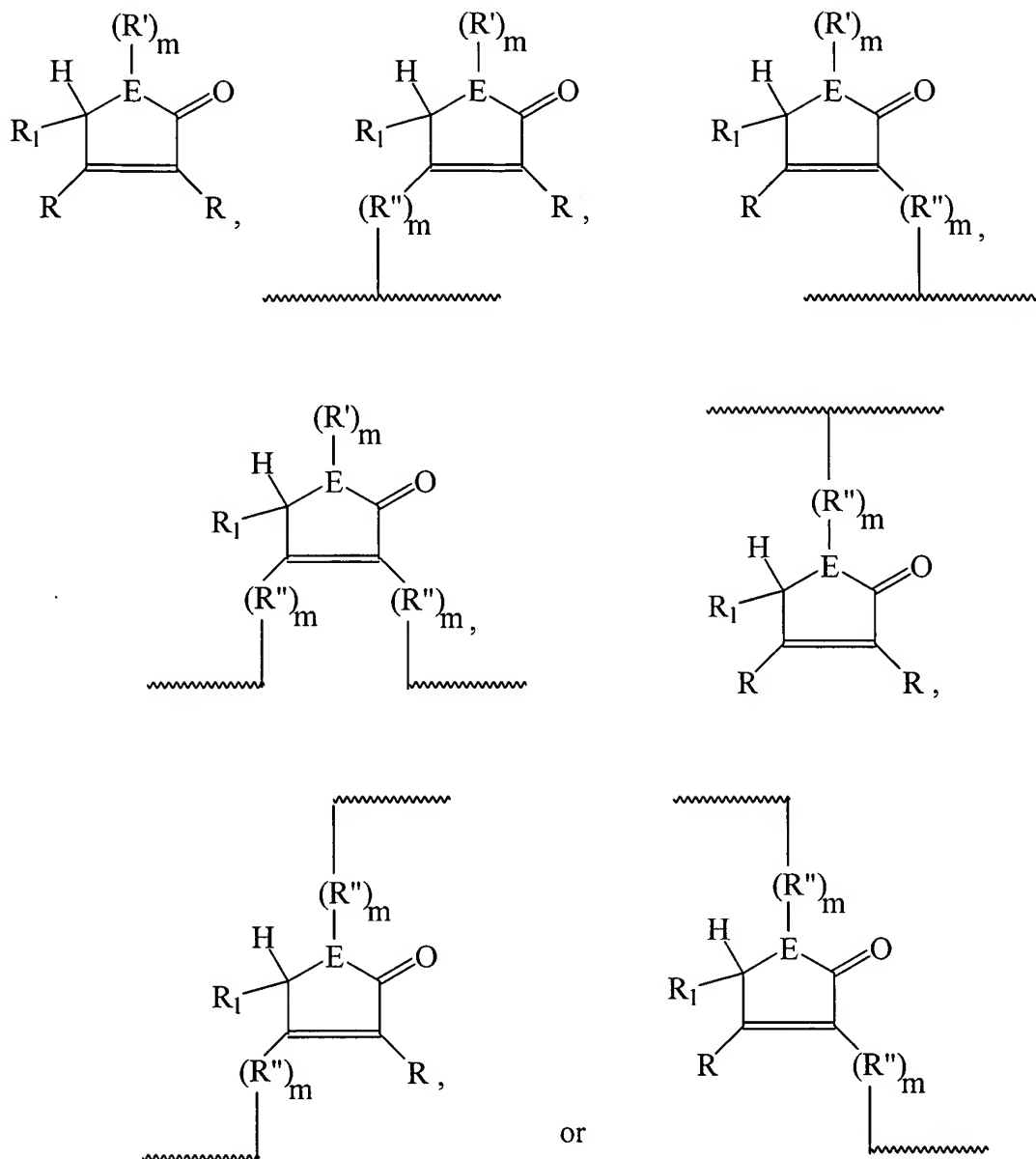
Claim 30. A method according to Claim 29 wherein R is OR' and R₁ is H.

Claim 31. A method according to Claim 21 wherein said polymer is selected from the group consisting of poly(vinylchloride), polyethylene, polypropylene, polycarbonates, and mixtures thereof.

Claim 32. A method according to Claim 21 wherein said antioxidant is added during the polymerization of said polymer.

Claim 33. A method according to Claim 21 wherein said antioxidant is added during compounding said polymer.

1 Claim 34. A method of inhibiting the oxidation of a polymer comprising adding to a
2 polymer selected from the group consisting of poly(vinylchloride), polycarbonates,
3 polyethers, and mixtures thereof, about 0.005 to about 10 phr of an antioxidant having
4 the general formula

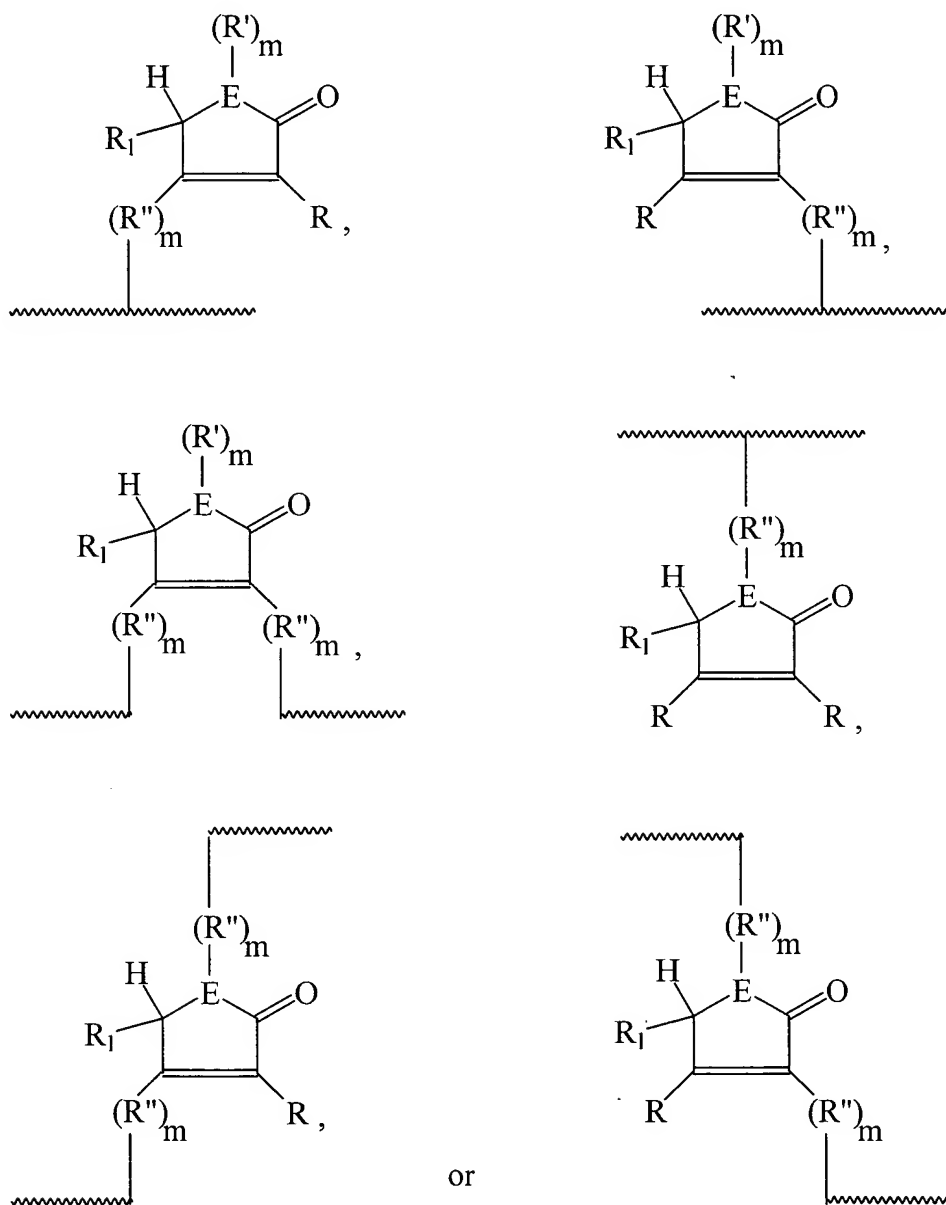


5 where each R is independently selected from H or OR'; R' is alkyl from C₁ to C₁₂; R₁ is
 6 H; R'' is alkylenyl from C₁ to C₁₂, arylenyl from C₆ to C₁₂, alkylarylenyl from C₇ to C₁₂, or
 7 arylalkylenyl from C₇ to C₁₂; E is O, and m is 0.

35. A method according to Claim 34 wherein said polymer is selected from the group consisting of poly(vinylchloride), polycarbonates, and mixtures thereof.

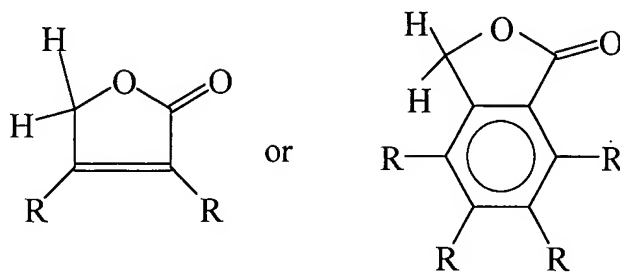
36. A method according to Claim 34 wherein R is H.

37. A method according to Claim 34 wherein said antioxidant has the general formula



- 1 Claim 38. A method of inhibiting the oxidation of a polymer adding to a polymer
- 2 selected from the group consisting of poly(vinylchloride), polycarbonates, polyethers,

and mixtures thereof, during compounding about 0.2 to about 5 phr of an antioxidant having the general formula



where each R is independently selected from H or OR' and R' is alkyl from C₁ to C₁₂.

Claim 39. A method according to Claim 38 wherein R is H.

Claim 40. A method according to Claim 38 wherein R is OR'.